

FORM PTO-130
(REV 11-96)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

YMOR: 214

U.S. PATENT APPLICATION NO. (If known, see 37 CFR 1.5)

097889230

INTERNATIONAL APPLICATION NO.

PCT/JP00/00179

INTERNATIONAL FILING DATE

17 January 2000

PRIORITY DATE CLAIMED

18 January 1999

TITLE OF INVENTION

OPTICAL DISK REPRODUCING DEVICE

APPLICANT(S) FOR DO/EO/US

Naoki YUMIYAMA


Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). (Claims Only)

Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
PCT Request;
Written Opinion (PCT/IPEA/408).

PLEASE ACCEPT THIS AS
AUTHORIZATION TO DEBIT
OR CREDIT FEES TO
DEP. ACCT. 16-0331
PARKHURST & WENDEL

097889230		INTERNATIONAL APPLICATION NO PCT/JP00/00179	ATTORNEY'S DOCKET NUMBER YMOB: 214
17. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)) : Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1,000.00 International preliminary examination fee (37 CFR 1.482) not paid to (USPTO) but International Search Report prepared by the EPO or JPO \$860.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$760.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$690.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 <div style="text-align: right;">ENTER APPROPRIATE BASIC FEE AMOUNT =</div>			CALCULATIONS PTO USE ONLY
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).			\$
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	4 - 20 =	0	X \$18.00
Independent claims	2 - 3 =	0	X \$90.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$270.00
TOTAL OF ABOVE CALCULATIONS =			\$ 860.00
Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).			\$
SUBTOTAL =			\$ 860.00
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).			\$
TOTAL NATIONAL FEE =			\$ 860.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property			+ \$ 40.00
TOTAL FEES ENCLOSED =			\$ 900.00
			Amount to be: refunded \$
			charged \$
a. <input checked="" type="checkbox"/> A check in the amount of \$ <u>900.00</u> to cover the above fees is enclosed. CR# <u>14246</u>			
b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.			
c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>16-0331</u> . A duplicate copy of this sheet is enclosed.			
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.			
SEND ALL CORRESPONDENCE TO: Roger W. Parkhurst PARKHURST & WENDEL, L.L.P. 1421 Prince St., Ste. 210 Alexandria, VA 22314-2805 Tel: (703) 739-0220			<div style="text-align: center;">  SIGNATURE Roger W. Parkhurst NAME <u>25,177</u> REGISTRATION NUMBER </div>

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of
Naoki YUMIYAMA et al.
Serial No.: New Application
Filed: July 13, 2001
For: OPTICAL DISK REPRODUCING DEVICE

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination of the above-identified application,
please enter the following specification changes as noted below:

IN THE CLAIMS:

Please add new claims 3 and 4 below:

3. (New) A method of spin-up processing employed in
reproducing a disk-shaped recording medium on which recording is
made, in which control of a spindle motor is accomplished by CAV

control during a process from the start of the spin-up processing to a read standby state, said method comprising the steps of:

setting the spindle motor to be driven under the CAV control;

performing servo adjustment and then acquiring a LEAD-IN final address;

conducting CLV measurement and then setting an angular velocity to be slower than a maximum rotational speed to perform a predetermined processing; and

performing HOLD TRACK.

4. (New) The method of spin-up processing according to claim 3, wherein said angular velocity slower than a maximum rotational speed is a half of the maximum rotational speed.

REMARKS

Claims 1-4, as amended, remain herein. Claims 3 and 4 have been added hereby.

This Preliminary Amendment is submitted to conform the U.S. patent application to the international application.

Examination of this application on its merits is respectfully requested.

Respectfully submitted,

PARKHURST & WENDEL, L.L.P.

July 13, 2001
Date



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JC18 Rec'd PCT/PTO 13 JUL 2001

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DESCRIPTION

OPTICAL DISK REPRODUCING DEVICE

5 Technical Field

The present invention relates to an optical disk reproducing device (International Patent Classification G11B 7/00), and particularly to an optical disk reproducing device in which spin-up processing of the optical disk reproducing device and a method of controlling rotation of a spindle motor during low-speed rotation of the optical disk are carried out by CAV control (constant angular velocity control).

15 Background Art

Such an optical disk reproducing device is configured as shown in FIG. 2.

An optical disk 1 is rotationally driven by a spindle motor 2. An optical head 3 reading information from the optical disk 1 is driven by a traverse motor 4 in a radial direction of the optical disk 1.

An output signal of the optical head 3 is inputted to a DSP (digital signal processor) 5 via an amplifier 4. The DSP 5 controls the focus of the optical head 3 via an actuator driver 6 so as to suitably set the focus of the optical head 3. Further, the DSP 5 controls both of a spindle motor 2 and a traverse motor 4 via a spindle traverse driver 7 so as to suitably drive the motors 2, 4.

A CPU 8 is a central processing unit which is operated by a control program and sends an instruction to make the DSP 5 carry out desired processing. An ECC & I/F9 has an ECC (error-checking and correction) function and an interface function and is a device for controlling the communication with a host computer. A DRAM 10 is a memory for temporarily

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storing read data. Reference numeral 11 denotes a system control processing section.

Incidentally, as for an optical disk, the following method has been generally adopted: information is recorded with an equal density entirely from an inner periphery to an outer periphery. In an optical disk reproducing device for reproducing such an optical disk, as for spindle motor rotation control during spin-up processing, a method using CLV control (constant linear velocity control) has been known in general. The CLV control is a method of changing the number of rotations according to a position of an optical head in a radial direction and obtaining a constant length of a track, which is read by the optical head in a unit time.

FIG. 3 is a flowchart showing the above processing.

In step S1, setting is made to drive the spindle motor 2 at a constant linear velocity by CLV control. In step S2, servo adjustment is carried out. In step S3, a LEAD-IN final address is acquired. In step S4, CLV measurement is carried out at the above address by CLV control.

In step S5, control is accomplished such that the spindle motor 2 is switched from CLV control to CAV control and a constant angular velocity is obtained.

In step S6, an angular velocity is changed to a half of a maximum rotational speed (twelve-speed at a maximum of twenty-four-speed).

In step S7, TOC (table of contents) serving as index information of the disk is read.

In step S8, SUB-Q (additional information for providing data with a high-level function) less than 00:02.00 is acquired.

In step S9, a HEADER difference is acquired based on the SUB-Q of step S8 and READ SET is carried out.

In step S10, the velocity changed in step S6 is reset and HOLD TRACK is carried out.

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As described above, when processing before a read standby state is carried out using CLV control (constant linear velocity control), the number of rotations on the inner periphery and the outer periphery is changed according to the position of the optical head. Therefore, it is always necessary to monitor data recorded in the optical disk.

Thus, when the optical head is out of focus or tracking, it is not possible to find a present rotational speed. Therefore, it is necessary to reduce the number of rotations of the optical disk to carry out re-pull-in of CLV, resulting in a problem of a longer spin-up time.

Disclosure of Invention

An object of the present invention is to provide an optical disk reproducing device configured such that even if an optical head is out of focus, an operation for re-pull-in of CLV is not necessary, and it is possible to shorten the time to wait for the rotation of an optical disk, shorten the seek time to arrive at inner and outer peripheries, accomplish stable control, and shorten the spin-up time.

According to the optical disk reproducing device of the present invention that is devised to solve the above problem, processing before a read standby state is divided into steps and all the steps are carried out by CAV control (constant angular velocity control).

According to the above configuration, even if the optical head is out of focus, it is not necessary to change the number of rotations. Therefore, unlike CLV control, it is not necessary to reduce the number of rotations of the optical disk to carry out re-pull-in of CLV. Further, since the time is shorter to wait for the rotation of the optical disk, it is possible to shorten the seek time to arrive at the inner and outer peripheries, accomplish stable control, and shorten the spin-up time.

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An optical disk reproducing device according to claim 1 of the present invention is characterized in that the control of a spindle motor is accomplished by CAV control (constant angular velocity control) during a process from a start of the spin-up processing to the read standby state in the optical disk reproducing device for reproducing disk-shaped recording media, on which recording is made with a constant linear velocity.

According to the configuration of the present invention, even if the optical head is out of focus or tracking, it is not necessary to reduce the number of rotations of the optical disk to carry out re-pull-in of CLV. Further, since the time to wait for the rotation of the optical disk is reduced, it is possible to shorten the seek time to arrive at the inner and outer peripheries and to accomplish stable control.

An optical disk reproducing device according to claim 2 of the present invention is characterized in that, in claim 1, the control of the spindle motor is accomplished by CAV control (constant angular velocity control) during a control processing when the disk-shaped recording media rotates at a low speed.

Brief Description of Drawings

FIG. 1 is a flowchart showing spin-up control processing in an optical disk reproducing device of the present invention;

FIG. 2 is a typical block diagram showing an optical disk reproducing device; and

FIG. 3 is a typical flowchart showing spin-up control processing in the optical disk reproducing device.

Best Mode for Carrying Out the Invention

Referring to FIG. 1, an embodiment of the present invention will be described below.

Here, since the configuration of the hardware is identical to FIG. 2 showing the conventional art, the explanation will be made with the same reference numerals.

FIG. 1 shows system control processing from physical
5 spin-up processing to a read standby state in an optical disk
reproducing device of the present invention.

In step S1, setting is made to drive a spindle motor 2 by CAV control (constant angular velocity control) instead of conventional CLV control (constant linear velocity control). In step S2, servo adjustment is carried out. In step S3, a LEAD-IN final address is acquired. In step S4, CLV measurement is carried out.

In step S5, an angular velocity is changed to a half of
a maximum rotational speed (twelve-speed at a maximum of
15 twenty-four-speed).

In step S6, TOC (table of contents) serving as index information of the disk is read.

In step S7, SUB-Q (additional information for providing data with a high-level function) less than 00:02.00 is
20 acquired.

In step S8, a HEADER difference is obtained based on the SUB-Q of step S7 and READ SET is carried out.

In step S9, the velocity changed to a half in step S5 is reset and HOLD TRACK is carried out.

25 According to the above configuration, since all the steps
are carried out by CAV control, it is possible to shorten the
time to wait for the rotation and the seek time.

As described above, according to the optical disk reproducing device of the present invention, when reproducing 30 the optical disk having information recorded on the entire surface with an equal density, the process from the start of spin-up processing to the read standby state is entirely carried out by CAV control. Thus, even if the optical head is out of focus, it is possible to keep a stable number of

rotations, reduce the time to wait for the rotation, and shorten the seek time, resulting in a shorter spin-up time.

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CLAIMS

1. An optical disk reproducing device for reproducing a disk-shaped recording medium on which recording is made with a constant linear velocity,
5 characterized in that control of a spindle motor is accomplished by CAV control during a process from a start of spin-up processing to a read standby state.
- 10 2. The optical disk reproducing device according to claim 1, wherein control of said spindle motor is accomplished by CAV control during a control processing when said disk-shaped recording medium rotates at a low speed.

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FIG. 1

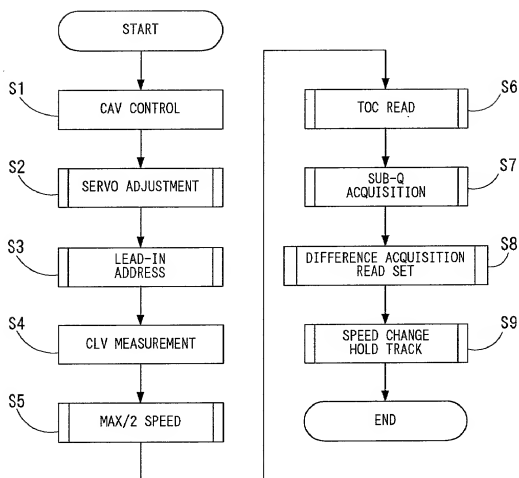
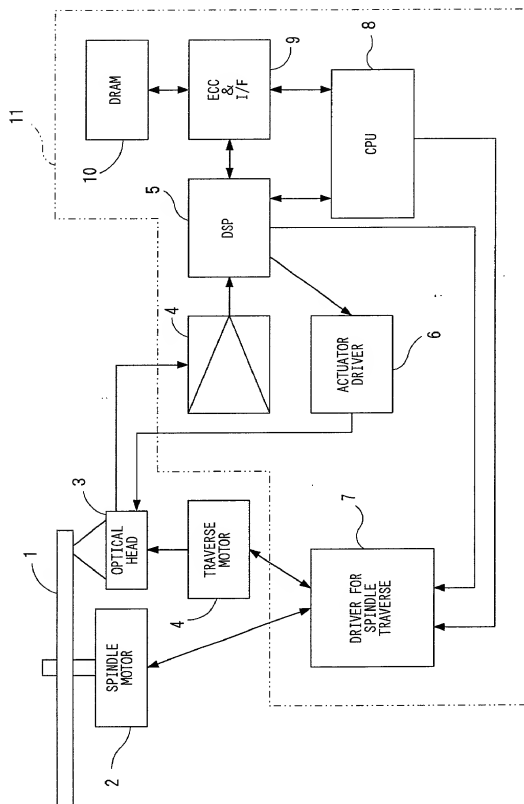
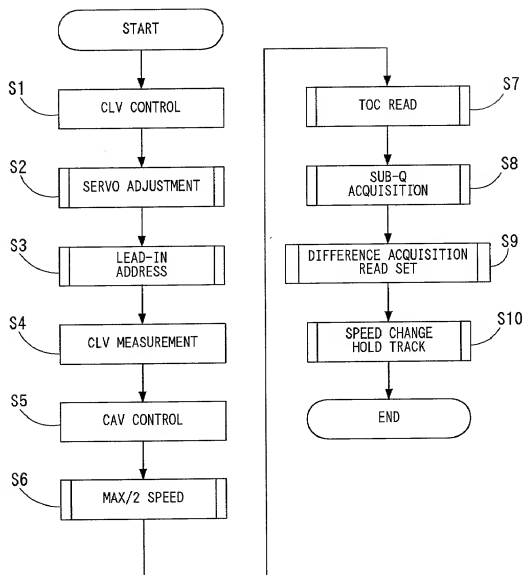


FIG. 2



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FIG. 3



**Declaration and Power of Attorney
Under Patent Cooperation Treaty
35 USC §371(c)(4)**

As a below named inventor, I hereby declare that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe that I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural names are named below) of the invention entitled: OPTICAL DISK REPRODUCING DEVICE

described and claimed in the international application number PCT/JP00/00179 filed January 17, 2000 and as amended on November 24, (if any), the specification and claims of which I have reviewed and understand and for which I solicit a patent. 2000

I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a), and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to my international application by me or my legal representatives or assigns, except as follows:

Japanese Patent Application No. 11-008583 filed on January 18, 1999

The priority of the above applications (if any), filed within a year prior to my international application is hereby claimed under 35 USC 119. I hereby appoint the following as my attorneys of record with full power of substitution and revocation to prosecute this application and to transact all business in the patent office: 3

Roger W. Parkhurst, Reg. No. 25,177; Charles A. Wendel, Reg. No. 24,453; Lawrence D. Eisen, Reg. No. 41,009.

ALL CORRESPONDENCE IN CONNECTION WITH THIS APPLICATION SHOULD BE SENT TO:
PARKHURST & WENDEL, L.L.P., 1421 PRINCE STREET, SUITE 210, ALEXANDRIA, VIRGINIA 22314-2805, TELEPHONE (703) 739-0220.

I hereby declare that I have reviewed and understand the contents of this Declaration, and that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

3. Full Name of Sole /-00
or First Inventor Naoki YUMIYAMA

Given Name

Middle Initial

Family Name

*4. Inventor's Signature Naoki Yumiyama

Date of Signature June 28, 2001

Month

Day

Year

6. Residence 202 Ikeda Bldg., 682-1, Fukuonjimachi, Matsuyama-shi, Ehime 790-0921 Japan

City

State or Province

Country

7. Citizenship Japanese

8. Post Office address c/o MATSUSHITA-KOTOBUKI ELECTRONICS INDUSTRIES, LTD.
(Insert complete mailing address, including country) 8-1, Furujin-machi, Takamatsu-shi, Kagawa 760-0025 Japan

*IF THERE IS MORE THAN ONE INVENTOR USE PAGE 2 AND PLACE AN "X" HERE ☐.